Claims

1. A polymer compound, comprising at least one biodegradable polyester having a terminal functional group based on hydrophilic moieties of phospholipids.

2. A polymer compound as claimed in claim 1, comprising a plurality of biodegradable polymers emanating from a central core so as to form a dendrimer.

3. Aggregate of polymers as claimed in claim 1, having the shape of micelles, vesicles and membranes.

4. A polymer compound as claimed in any of claims 1-3, wherein said polyester is polymerized from a cyclic monomer.

5. A polymer compound as claimed in claim 4, wherein said cyclic monomer is selected from the group of cyclic esters and carbonates.

6. A polymer compound as claimed in claim 5, wherein said cyclic esters and carbonates are selected from the group consisting of ε-caprolactone, lactide, glycolide, β-butyrolactone, propiolactone, trimethylenecarbonate and combinations thereof.

7. A polymer compound as claimed in any of the preceding claims, wherein the terminal functional group is phosphatidyl choline, phosphatidyl ethanolamine, phosphatidyl serine, ammonium salt, carboxylic acid or carboxylate, phosphonic acid, phosphate, phosphonate, sulphonate, sulphonic acid, peptide, nucleotide, carbohydrate.

8. A polymer compound as claimed in any of claims 1-7, wherein the terminal functional group is positively charged.

9. A polymer compound as claimed in any of claims 1-7, wherein the terminal functional group is negatively charged.

10. A polymer compound as claimed in any of claims 1-7, wherein the terminal functional group is zwitterionic or electrically neutral.

11. A polymer compound as claimed in claim 1-10, the molecular weight of which is in the range of 1000 – 200 000 g/mol, preferably 20 000g/mol.

12. A dendrimer type polymer compound as claimed in claim 2, forming an essentially spherical particle with said functional groups forming the surface layer of said spherical particle.

13. An object provided with a coating made of a polymer compound as claimed in claim 1, wherein said polymer compound forms a layer having a thickness of 0.1 – 100 μm, said functional groups forming an outer layer of said coating.

14. The object as claimed in claim 13, wherein said coating is loaded with an (biologically) active agent.

15. The object as claimed in claim 13 or 14, wherein the object is an object used in biological or medical applications.

16. The object as claimed in claim 15, wherein it is a medical device, medical device for implantation, stent, artificial orthopedic device, spinal implant, joint implant, attachment element, bone nail, bone screw, or a bone reinforcement plate.

17. A drug formulation, comprising a solution of micelles or spherical particles formed by a polymer compound as claimed in claim 1, wherein the micelles or particles enclose a medicament.

18. A method of preparing a biodegradable and biocompatible polyester having a terminal functional group based on a phospholipid, the method comprising the following steps:
-reacting a cyclic ester monomer and an alcohol in the presence of a catalyst/an initiator to provide a ring opened polymer having an –OH terminal end;

-reacting the –OH terminal end of the obtained polymer with a phosphorous-containing compound to provide a polymer having a phosphate terminated polymer; and

-reacting said phosphate terminated end of said polymer to obtain a polymer having functionalized end.

19. The method as claimed in claim 18, wherein said phosphorous containing compound is selected from the group consisting of ethylene chloro phosphate.

20. The method as claimed in claim 18 or 19, wherein the step of providing a functionalized polymer comprises reacting the terminal end with Me_3N.

21. The method as claimed in any of claims 18-20, wherein the resulting polyester is poly ε-caprolactone–phosphatidyl choline.

22. The method as claimed in claim 21, wherein the resulting yield of the poly ε-caprolactone–phosphatidyl choline is at least 90%.

23. A method of preparing biodegradable and biocompatible polyester phospholipid-like analogues having a cationic terminal functional group, the method comprising the following steps:

-reacting a cyclic ester monomer and an alcohol in the presence of a catalyst/an initiator to provide a ring-opened polymer having an –OH terminal end;

-reacting said –OH terminal end of the obtained polymer with a ω-halo acid halide to obtain an alkyl halide; and

-reacting said polymer/ polymers to obtain a polymer having a functionalized end.

24. The method as claimed in claim 23, wherein the step of providing a functionalized polymer comprises reacting the terminal end with Me_3N.

25. The method as claimed in claim 23 or 24, wherein the resulting polyester is poly ε-caprolactone–ammonium salt.

26. A method of preparing a biodegradable and biocompatible polyester phospholipid-like analogues having an anionic terminal functional group, the method comprising the following steps:
-reacting a cyclic ester monomer and an alcohol in the presence of a catalyst/an initiator to provide a polymer having an –OH terminal end; and
-reacting the –OH terminal end of the obtained ring-opened polymer with a succinic anhydride to produce a functionalized (carboxylic acid)- or carboxylate-terminated polymer.

27. The method as claimed in claim 26, wherein the step of providing a functionalized polymer comprises reacting the terminal end with derivatives of derivatives of carboxylic acid or its anhydrides.

28. The method as claimed in claim 26 or 27, wherein the resulting polyester is poly ε-caprolactone–carboxylic acid or poly ε-caprolactone–carboxylate.